World Future Society

Social Innovation Forum

gTime, gDate and a gCalendar

By J.P. Singh

SUMMARY: The emergence of a cyberconnected Global Village demonstrates the need for a universal time for global events. A professor at the Indian Institute of Management in Ahmedabad argues that we need to delink the measurement of time from geography.

s.gif (1246 bytes)tarting with a review of the Concept of Time in Philosophy, Physics, Biology and Psychology, the paper argues that the availability of Cyber-connectivity and the emergence of the Global Village have highlighted the need for a universal time frame for global events. It additionally argues that the need extends beyond a universal time and encompasses the issues of date and calendar. It further argues that introducing this change may require de-linking of the time measurement from the geo-link and may also raise doubts about the assumed time-space singularity. The paper suggests that the representatives of the world arrive at an agreement to introduce a new epoch that gives a single precise portrayal of the global events. This is essential, as the global events have moved beyond the scientific domain and come in to the social and legal domain.

The Event

There are times when I receive an instantaneous response to my email and I know that both my respondent and me are there at our respective computers though separated in space. But then there are occasions when I scratch my head to figure out as to when might a particular email have been sent, marked as it is with the server time. My simple mind understands that there need not be any relationship between the user and the server locations.

Thus the task of identifying time of origin of an email becomes a bit difficult for an ordinary mortal. I know that it does not bother most people and it certainly does not bother the computer savvy. Yet I think even ordinary mortal's queries need to be respected. So I wonder if there is space for additional time.

The Time

In the human consciousness, time consists of a uniform unidirectional, irreversible passage that appears to be an inevitable, inexorable flow which only moves forward and is marked by a certain death in future.

In Philosophy, time has been variously seen and understood as an illusion (Parmenides and Zeno), a flow that encompasses illusoriness of the world (Indian Philosophy) or a flow that envelops illusory life (Buddha, Plato and Platinus) or even a flow which is the essence of reality

(Heracleitus).

These diverse interpretations of the human observation of time have led to sharp differences in perception of ultimate reality. Yet, regardless of the differences in philosophical comprehension of time, one thing is clear that all philosophy assumes time to be an entity with an independent existence.

The Biological view of time. That organisms have some sort of internal clock that regulates their behavior is quite well established. This fact refutes the contention that time is perceived only as a relation between successive sensations as propounded by Locke. Norbert Wiener has speculated that the human time sense depends on the alpha rhythm of electrical oscillation in the brain. This understanding once again de-links time from its space connectivity. The Parapsychological phenomenon of precognition also implies that time is an independent entity.

The scientific concept of time. The credit for linking a singular entity of time with space and converting two entities in to one unitary space-time entity goes to Hermann Minkowski, a Lithuanian-German mathematician. Minkowski, in his classic interpretation of Einstein's special theory of relativity made it clear that physics has to do only with a unitary space-time entity in which timelike and spacelike directions can be distinguished. By inference, 'Time' exists since space exists and either they exist together or they do not exist at all. This development was the logical culmination of Isaac Newton's distinction between 'absolute' time and "relative, apparent and common time". His 'absolute time' was an ideal scale of time that made the laws of mechanics simpler. Apparently the need for a composite Time-space entity arose because all awareness of time was based on movement and change in the space surrounding the observer. Thus treatment of 'Time' as an integrated Time-space singleton became a convenient concept rather than an undistorted representation of reality as perceived.

This has led to some unresolved issues. The space-time integration in the theory of relativity makes it harder to conceive of immaterial minds that exist in time but are not even localizable in space. It also raises the issue of reversibility of the time equations, something that is valid in all physics but unsubstantiated in the case of Time, thereby leading to the quest for a Time-Machine that can transport humans back in time.

The e-View of Time

Prima facie, there is no e-view of time. Yet, the introduction of cyber-connectivity forces mind to re-think the issue.

The Change

A key change as a result of the cyber-connectivity is that today events are taking place in the simultaneous and connected consciousness of numerous persons in many locations. This is something that did not much exist earlier and, therefore, did not require much thought.

But with cyber connectivity, the interacting persons, though located in different places (time zones) and experiencing different civil times, in actuality are existing, transacting, relating and thinking at the same time together in the cyber world.

The Absurd

As a result of this change in the cyber domain, one can experience the absurd, like seeing tomorrow's newspaper today or reading Today's paper yesterday. Like when sitting in the US on any given day one can read the morning paper published from New Delhi that is date marked for Tomorrow. Similarly, one can enter an e-business deal that is signed together but described in different times and dates.

The irony of the situation becomes apparent when we peruse ‘A Declaration of the Independence of Cyberspace’ by John Perry Barlow. The document dated ‘Fri, Feb 9, 1996 17:16:35 +0100’ ends with recording the date at the bottom as Feb 8, 1996.

The Process

The process of two person distant-but-simultaneously-connected-consciousness started with the telephone and the wireless. Radio did the same at the mass level, albeit in a unidirectional mode.

Television enabled the second step and added the mass and graphic connectivity, to the hitherto oral, again, only in one direction. As a result, millions of viewers were able to instantly hear and watch events happening thousands of miles away.

The cyber-connectivity has enabled the third step and provided the multi-modal connectivity both in a bi-directional and multidirectional mode.

No wonder, the mankind is confronted with a new class of events, including the 'absurd'.

Today, as a result of this process, thousands of people, including complete strangers, can share experiences and emotions without ever coming spatially together.

The Village

Notably, cyberworld events are not the only events occurring in the connected consciousness of numerous persons.

Parallely, events in space are also occurring under the simultaneous gaze of people who are spatially dispersed. E.g. the space travel, the space station and possible future inter-stellar journeys, say from Moon to Mars and monitored and controlled from a third place or a non-place.

Together, these two landmark changes, the space-travel and the multi-modal connectivity, have led to the evolution of a Global Village that we are now in. This has changed perspective of a common man and has led to changes in life and law. A 24-hour global economy is but just a reflection of the global village activity. Large-scale movement of people around the globe is another, as is the cooperation in space.

One More Time

The events occurring in the global village demand to be treated with a global perspective. As a start, they need to be recorded in a unique universal frame of time. A time frame that denotes events in an epoch, that is independent of the geo-link even if rooted in it.

Describing these events in a universal frame is the only way the domiciles of the global village will have a single precise portrayal of the global events, a need that is so central to human existence. This is essential, as such events are no more restricted to the domain of science but encompass the commercial, legal and the social domains.

A Date with Time

The need for time precision, by implication, also includes the need for date precision. After all, just as it is illogical to have an event described in different times, it is equally illogical to describe

it in different dates. Prima facie, the Global Date, to be universal, will have to be de-linked from its solar root.

What will be the alternative basis and how will it connect itself to the universal time is only a part of the question. The other part pertains to the associated global calendar that the world will need. These are the questions for re-examination in Chronometry.

The Time with Space

The introduction of a universal time frame that is not rooted in space also offers a unique opportunity to re-think the space-time linkage established by Newton-Einstein-Minkowski logic.

Whether such questioning of the old established link is acceptable, and what theories it upsets, is obviously a matter for the judgement of physicists.

This is so as the human events today are occurring in three kinds of space: geo, cyber and the inter-stellar. Meanwhile, the world must move on and carry the establishment of the Global Village a small step forward.

The Measurement

A time measurement assigns a unique number to an epoch, which specifies the moment when an instantaneous event occurs.

Although defining time presents difficulties, measuring it does not. The accuracy in specifying time is needed for civil, commercial and scientific purposes. As a result, time is the most accurately measured entity. The civil measurement of time is based on the consciousness of regular change rooted in "the repetitions of any recurring phenomenon and possibly subdividing the interval between repetitions". Thus time has been measured based on manifestations of gravitation, electromagnetism, rotational inertia and radioactivity.

Mankind rooted the measurement of time in the visible regularity of movement of Sun and Moon giving birth to the Solar and Lunar calendars. Over time, the alignment of this measurement got refined to the planetary movement to the tenth decimal point. Additional measuring scales were designed to meet different needs and additional measurement bases were employed to arrive at a precision not available in the planetary movements, like change in the rotational time due to changes in the tides. Thus we have Sidereal Time, Solar time, Universal Time, Dynamical Time, Civil and Standard Times, Atomic Time, Pulsar Time and Radiometric Time.

Back To Zero

One of the above mentioned measures should meet the needs of a universal time measure for the global village. Perhaps the Universal Time (UT) or the Coordinated Universal Time (UTC) comes closest to fulfilling this need. But it still leaves the date assignment as the unresolved issue and brings us back to the need for a universal zero for time and date. It also raises the issue of the localization of this measurement and thus it pushes one back to the issue of time (and date) space linkage.

Should the Assumed Universal Zero be determined at the Greenwich Observatory where the Earth's Zero Median was assigned? Or, should it be calculated at the Bureau International de l'Heure, which provides the Earth's rotational position in space? Or should it be located at the Defense Advanced Research Project Agency of the United States of America to honor the origin of the cyberspace that brought about the landmark change in human connectivity?

These are questions that are as much scientific as political. As is the question of deciding the precise moment of changeover and the start of a calendar.

The key issue is whether the scientific community and the world representatives will rise to the occasion and agree on a location, an instant and an epoch to define global events in a universal time frame.

As it often happens, regardless of any agreement, the global civil society today needs a single global universal time in addition to the Local Standard Time.

The Law

Acceptance in law provides the ultimate recognition to any new concept or an idea. With the adoption of e-signatures and associated cyber laws, mankind took the initial step to facilitate global transactions in the commercial world. Prima facie, the time is ripe to further enhance validity of the e-signature with a new, mutually agreed measure of time and date - a measure that is common to the geo, cyber and inter-stellar space.

Assuming agreement on a universally accepted Epoch of Time, one will still need a universally agreed Calendar even though based on an existing calendar. With the cyber laws still in their infancy, it may be necessary to incorporate the proposed universal time, date and calendar in the common World Law.

Such a step will facilitate not only the commercial and legal transactions but will also enable the social domain to keep pace with the changes in the scientific. Apart from being easy on the human mind, that is. Obviously, as the frontiers of science extend their boundaries, the legal and social issues need to be dealt with as they arise.

The Christening

Should the new epoch of time be Universal Time, Cybertime or eTime will also need to be agreed. In the Internet there are thousands of references to eTime and cybertime. The terms have generally been used to refer to the elapsed time for computer operations, which is no different from the time taken for any other activity except for its miniscule size. Alternatively, they have been used as a name for a service offering. Will one of these existing names be appropriate or does science need a new name to remove confusion is once again a matter of decision. But the Global world does need a Global Time, a Global Date and a Global Calendar.

Back to Future

M Ethan Katsh in his essay entitled Cybertime, Cyberspace & Cyberlaw comes close to de-linking time from space in the context of computer age but merely alludes to the likelihood of treating time differently in future and without voicing the need for a new epoch of time. Predicting future, obviously, can be a hazardous affair. Witness Carl Kaplan in Predicting the Legal Internet Issues for 2000. While experts identified several areas that will need legal solutions, none referred to the need for a new legal epoch of time. Apparently, the need has arisen sooner than expected.

References

_____. McGraw Hill Encyclopedia of Science & Technology. 18th Ed., McGraw Hill, 1997, Vol. 18, p 426-434

_____. The New Encyclopaedia Britannica. 15th Ed., Encyclopaedia Britannica Inc., 1994, Vol.

28, p 662-673.

ARPANET. History of Internet.

Barlow, John Perry. A Declaration of Independence of Cyberspace. Barlow@eff.org
Kaplan, Carl S. Predicting the Legal Internet Issues for 2000. Cyber Law Journal, Dec 31, 1999. 1-5.
Katsh, M. Ethan. Cybertime, Cyberspace & Cyberlaw. 1995. J. Online L. Art 1

About the Author

Dr. J. P. Singh is a Professor at the Indian Institute of Management, Ahmedabad; e-mail jpsingh@iimahd.ernet.in

Go to top of page

Comments? Questions? Critiques? Encouragement?

Send them here:

Your name

City and State

Country

E-mail address

Affiliation